FINANCIAL ASSESSMENT

STATE OF CALIFORNIA
HEALTH AND HUMAN SERVICES DATA CENTER
CHILD WELFARE SERVICES CASE MANAGEMENT SYSTEM
IBM CONTRACT EXTENSION
EFFECTIVE AUGUST 1, 2003

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Introduction

The State of California Health and Human Services Agency (HHSA), through its agent the Health and Human Services Data Center (HHSDC), has negotiated an extension of Contract #31091 between IBM Global Services and HHSDC for maintenance and operation of the Child Welfare Services Case Management System (CWS/CMS). The extension will be effective from August 1, 2003, though July 31, 2006, with options for extending two additional years through July 31, 2008.

The State of California undertook the negotiations with several planned objectives:

- Provide two to three years of time to prepare an RFP, select qualified vendors, and negotiate a new CWS/CMS operations and maintenance contract;
- Maintain continuity of services necessary to the critical mission of protecting and providing for California's children during this period;
- Improve the ability of the State to manage costs for CWS/CMS during the contract extension period;
- Resolve operating procedure issues on testing and documentation; and
- Facilitate the transition process should another maintenance and operations vendor or vendors be selected through the RFP process.

IBM recognized the State's objectives and participated in developing a contract extension that has met all of the State's objectives. IBM maintained their contractual position as sole provider of CWS/CMS services, but a key element of the contract extension as negotiated is a significant reduction in operations and maintenance costs from the existing contract.

At the request of the HHSDC, SolutionsWest undertook an independent assessment of the financial elements of the proposed contract extension, which will become Amendment 20 of the contract between HHSDC and IBM Global Services. The purpose of this assessment is to establish that the price paid by HHSDC for maintenance and operation of the CWS/CMS is reasonable in terms of services provided, resources necessary for the services, and the general marketplace for these resources. This assessment cannot establish the best price for these services, since that is possible only at the completion of a competitive procurement process leading to a contract award, when potential suppliers make "best and final" offers based on a thorough understanding of the resources needed and are motivated by the possible revenues. Instead, this document will assess whether the price paid to IBM Global Services per Amendment 20 represents a reasonable value in relation to services provided and in relation to conventional measures.

This analysis was facilitated by a decomposition of the annual maintenance and operations costs among 15 distinct services areas and their related cost pools. The decomposition was provided by IBM during the course of negotiations that led to the proposed Amendment 20, and was a key demand by the State during the negotiations.

The analysis herein presents descriptions of services provided in each service area, resources utilized in providing those services, common and comparable metrics for these services, and costs. Project management services are treated as a separate cost pool and validated for reasonableness. For cost comparisons, project management costs have been allocated over the direct service pools where appropriate.

The writer notes that a fundamental assumption and business model adopted by the State of California Department of Social Services (CDSS) and accepted by the US Department of Health and Humans Services, Administration for Children and Families (ACF), was that the welfare of California children would be served best by use of a single contractor responsible for the development and operation of the entire CWS/CMS. By selecting an eminently qualified service provider, and contracting for guaranteed service delivery, the risks of system failure or fragmentation could be minimized. This assumption predated the initial CWS/CMS award to IBM Global Services, and forms a base for the analysis following herein. Indeed, the only route possible for alternative business models would be to issue an RFP that allows for alternatives, which could not be accomplished before the current contract expires.

Rider I of Contract #31091 includes pricing for services that may be selected by counties at their option. Since the State is not contractually obligated or likely to use the services offered, they are not included in this analysis.

Further, this analysis does not consider significant changes in architecture that might occur during the term of the contract. If the application is modified to support a browser-based desktop rather than client server, several cost changes would occur. Desktop support costs would be reduced, processing loads would require additional capacity on the mainframe host or other servers, and bandwidth usage and network costs could increase. Costs would not conform to the structure described herein, and hence this analysis would not be valid.

Summary

The primary objectives of the State during negotiation for extending Contract # 31091 were achieved. Under the proposed Amendment 20, the financial terms constitute a reasonable pricing model for the CWS program, the State of California, and the US Department of Health and Human Services (USDHHS), and an improvement over the IBM Global Services contract in its current form. The primary benefits arise from several changes to the contract terms:

- Reduction in the monthly baseline payment;
- Elimination of Additional Resource Charges (ARCs);
- Migration from CPU-hour based additional ARCs to paying for upgrades when capacity limits are reached; and
- Better understanding of the relationship between project decisions and activities and their resulting maintenance and operations costs.

During the negotiations, IBM's provided a decomposition of their base maintenance and operations costs among different service areas. Where a reasonable comparison can be made, the costs of various service and activities provided to CWS/CMS are consistent with industry practices. The table below summarizes the comparisons:

Contract Service Elements	Contract Rates	Industry Standard Rates
Project Management	8.4% - 10.9% of costs	10% of costs
Application Maintenance with Help Desk	13% - 15% of application costs	17% - 22% of application cost
Managed Operations – Mainframe and WEB services	$15,459 - $16,622 per MIP per month	$15,000 - $20,000 per MIP per month
Technical Services	185 PCs per support FTE	50-100 PCs per FTE

This table indicates that services provided under Amendment 20 are provided efficiently and at a resulting reasonable price to the State. The above comparisons show contract costs are at or below standards, and productivity in the case of PC support above standards. The services listed in the above table are the most costly elements of the contract, totaling $43.352 million or 79% of base maintenance and operations costs in the first year of the amendment.

In other areas, standards are not as well accepted or consistently defined. For example, network costs are dependent on application architecture, and can differ substantially among non-processing terminals, integrated client desktops (as CWS/CMS) and browser-based systems. In these areas, involving 21% of base maintenance and operations charges, unit costs calculations yield reasonable results, as shown below:

Contract Service Elements	Unit Costs
Network Services	$46 per user per month, or $2,337 per site per month*
Server Management Labor (included in Network Services)	$9,100 per server per year
Network Services Labor (included in Network Services)	$1,500 per unit monitored per year
Help Desk, technical services component	$2.90 per user per month

* - Includes non-contract HHSDC WAN, estimated cost of $4.2 million annually.

In lieu of ARCs for CWS/CMS workstations and users, the State has agreed in Amendment 20 to limit growth in the number of authorized users and sites to 10% annually, compounded. Should these limits be exceeded, which is improbable, the contract price will be subject to renegotiation. Under this circumstance, the analysis contained herein will no longer be valid.

The primary reason that Amendment 20 offers a better value to the State than the pricing in Amendment 13 is a more favorable and realistic model for mainframe host services. This is the largest component of the CWS/CMS costs at 30% of the total baseline. Under Amendment 20, increased utilization and CPU growth result in a lower cost per MIP of system capacity (Millions of Instructions per Second, or MIPS, is one of the standard efficiency measures for computer operations). If all the upgrades are needed and implemented per the proposed schedule in the Amendment 20, price per MIP (without project management) per year will be $16,662 (1,119 MIPS) on August 1, 2003, and decline with each upgrade to $15,147 per MIP per year (2,094 MIPS) on July 31, 2008. This price scalability is one of the primary advantages for mainframes, and Amendment 20 passes this advantage to the State.

As an illustration, presented below is a comparison of costs between July 2003 (the last month predating Amendment 20) and August 2003. Assuming that CPU usage grows at the rate of 5% increase over the same month in the preceding year, that User ID and Workstation counts increase 0.25% each month, that DASD utilization remains below the ARC threshold, and that dial-up connection charges remain unchanged from December 2002, we note the following:

Cost Item	Amendment 13 price July 2003	Amendment 20 price August 2003
Baseline monthly cost	$4,730,000	$4,596,667
CPU ARCs	901,676	N.A.
User ID ARCs	206,142	N.A.
DASD ARCs	0	N.A.
Dial-up ARCs	10,836	10,836
Total	$5,848,654	$4,607,503

This would be a savings in the first month of $1.24 million from the price in Amendment 13, a clear financial advantage of Amendment 20 compared to the current terms. In the first year of the contract the savings will exceed $12 million with certainty, and will exceed $14 million if CWS/CMS experiences reasonable rates of growth in utilization.

Terminology

The following terms are utilized in the enclosed analysis:

- **Authorized users** are all users with currently active user identification and passwords registered by the RACF security software utilized by CWS/CMS.

- **Base maintenance and operations charge (BM&O)** is the monthly and annual costs for CWS/CMS maintenance and operations per Amendment 20, without including the costs related to CPU upgrades. CPU upgrades will be implemented on an as-needed basis, so the costs to be incurred are not yet known.

- **CAD** is the County Access to Data database maintained to support end user report generation and data queries. The database resides on separate servers and disk storage devices and not on the primary host baseline, reducing the risk of system performance problems.

- **Coexistent counties** are those where CWS/CMS desktops may be linked to servers and applications not a part of CWS/CMS, and where desktop and LAN support is provided by county staff.

- **Dedicated counties** are those where CWS/CMS desktops are connected only to CWS/CMS servers and install only software necessary for CWS/CMS. These workstations are supported by IBM staff.

- **Full amendment costs** are the total costs provided within the Amendment 20, assuming that mainframe upgrades occur per the amendment's proposed schedule, that the two optional years are used, that the entire pool of application enhancement funds are utilized and that dial-up costs equal the amount provided in the amendment. This amount is $362,834,004.

- **MIPS** is a standard measure of mainframe computer capacity, Millions of Instructions per Second. As currently configured, the mainframes that support CWS/CMS have a usable capacity of 1,190 MIPS. 1,119 MIPS are dedicated to application operations, and 71 MIPS are dedicated to application maintenance.

- **Monthly mainframe usage** is the average utilization of the system capacity reported in the monthly IBM maintenance report as number of MIPs utilized. This measure will be the determining factor in decisions to upgrade the host mainframe computer.

- **Work authorizations** are work orders presenting tasks, resources, price and deliverables for system change initiatives provided for in the contract.

Contract Pricing and Terms

Under the proposed Amendment 20, IBM Global Services and California HHSDC negotiated a CWS/CMS contract extension for the period August 1, 2003, through July 31, 2006 (three years). The base maintenance and operations price is $55,160,004 for the first year, $55,245,000 for the second year, and $55,320,000 for the third year. Annual changes reflect additional data storage requirements only. In addition, IBM Global Services guaranteed the baseline price for two optional additional years, at $57,320,004 for year four and $59,319,996 for year five, a 3.6% and 3.5% increase respectively. The total baseline maintenance and operations cost over 5 years will be $282,365,004 if no CPU upgrades are needed.

The proposed amendment also includes funding for dial-in hourly charges on an as-needed basis, $10.5 million annually for system changes , and possible increases to base maintenance and operations cost for CPU upgrades on an as-needed basis up to a five year total of $26,769,000. The maximum payments for five years are limited to $362,834,004.

Amendment 20 eliminates Additional Resource Charges that were a feature of the CWS/CMS contract through amendment 19, including number of workstations, number of active user ids, gigabytes of Direct Access Storage Device (DASD) disk storage space, and CPU hours. The workstation and user id issue is managed through maximum levels that the State does not expect to exceed and that are consistent with project history, as discussed later in this analysis. These levels are contractually set not to exceed 10% growth each year. The State also agreed to limit the growth in number of sites to 10% each year. DASD increases are included in the scheduled baseline costs, and no further DASD charges are included within the contract terms.

The contract continues the existing actual dial-up connection charges at $3.50 per hour ($6.00 per hour if using a toll-free 1-800 number). This service has been and will be billed at actual usage, as has been the practice under the IBM-CWS/CMS contract since this service began. Case workers and users who are conducting child service activities outside their home offices can dial in and utilize CWS/CMS through local telephone services as needed. During calendar 2002, total dial-up charges were $141,645. The proposed Amendment 20 includes up to $200,000 (not-to-exceed) per year of payments to IBM for actual dial-up usage in the first year of the contract. An additional $20,000 is added each subsequent year, allowing for expanded use of this service without amending the CWS/CMS contract further. Regardless of the amount included, only actual usage is authorized by the contract.

Amendment 20 also provides for increased base maintenance and operations payments to cover mainframe upgrades. The base M&O monthly payment will increase $1,000 per MIP of capacity increase beginning the first month following an upgrade. Under this scenario, an increase in mainframe capacity of 100 MIPs will result in an addition to the baseline of $100,000 per month for each subsequent remaining month of the contract, or $1.2 million annually. All mainframe upgrades will require concurrence and prior written approval from the State. Historically, mainframe upgrades have been implemented when utilization approaches 70% of capacity.

Amendment 20 also stipulates that the base maintenance and operations monthly charges will increase only if the upgrades are needed and approved by the State. The proposed amendment anticipates CPU upgrades in December 2003, August 2004, and September 2005. It also provides for upgrades if the optional fourth and fifth year occur, in September 2006, July 2007 and April 2008. If all upgrades are implemented in accordance with the schedule, total payments for upgrades will be $9.712 million over the three years of the contract, and additional $7.346 million if the fourth year option is exercised, and an additional $10.251 million if the fifth year option is exercised.

The final cost of Amendment 20 cannot be stated definitively, but will not exceed $362,834,004. The final cost depends on the need to perform upgrades (i.e. the actual growth in system use), the actual usage of dial-up services and the exercise of the two optional years.

In lieu of user and workstation ARCs, Amendment 20 places a limitation on the growth in the number of CWS/CMS sites and authorized users. The limitations require the State to limit growth in the number of users and the number of sites not to exceed a base increased by 10% each year, compounded. The base is the average number of users and sites over the twelve month period ending July 31, 2003. This implies that the base will be approximately 19,150 authorized (RACF registered) users, the average over the last 8 months, and 390 sites, the average over the last two quarters. This would allow the State to reach the following approximate user and site counts without exceeding contractual limits:

Amendment Year Ending	Maximum Number of Authorized Users	Maximum Number of Sites
July 31, 2004	21,065	429
July 31, 2005	23,172	472
July 31. 2006	25,489	519
July 31, 2007	28,038	571
July 31, 2008	30,841	628

This analysis is valid only if these limits are not exceeded. Under the terms of Amendment 20, the contract must be renegotiated if the site or authorized user limits are exceeded, which voids the contract price assumptions used herein.

The State will need modest user management rules to ensure these limits are not exceeded. However, there is little apparent risk. From the end of 2000 until the end of 2002, authorized users increased from 18,654 to 19,201, or an average of 1.48% per year, well below the contractual limit. The increase for any one month over the preceding twelve months has not exceeded 10% since March 2000, nearly three years ago. Site count growth has never exceeded 10% in any calendar year, and has been 4% or less for the past two calendar years.

One consequence of Amendment 20 is the disappearance of user and workstation ARCs, costs which formerly were shared by the counties. This was intended to serve as an incentive to the counties to control growth in authorized users, since counties paid the related ARCs for each user above their baseline limit. This incentive may have contributed to the decline user and workstation counts since the peak of 20,205 authorized users in December 2001. The State will need to devise an alternative to the

“negative incentive” that ARCs posed for the counties as Amendment 20 is implemented, assuming that this in fact influenced country decisions.

Composition of Contract Costs

A primary objective in the process of negotiating an extension of the Child Welfare Services Case Management System (CWS/CMS) contract between the State of California Health and Human Services Agency Data Center and IBM was to provide a more complete picture of the relationship between services and costs. HHSDC intended to establish a correlation between service and activities provided by IBM in supporting CWS/CMS, and the resources and costs associated with these services. This information allowed the State to validate the economic soundness of the CWS/CMS contract extension, as demonstrated herein. Further, the State will use this information to assess the effects of proposed system changes on various IBM support activities and their related costs. The State can better evaluate the benefit of a system change in relation to IBM's proposed operating and maintenance cost after implementation. For example, an addition to application functionality could cause increased mainframe usage resulting in the need for an upgrade, and this factor now may be considered in the cost analysis of the modification.

In response the State's request, IBM provided a list of specific service areas. Consistent with typical usage, this document will refer to these areas as cost pools. For each cost pool, IBM identified the activities included within each pool, provided measures of the activities included in each pool, identified necessary resources within each pool, and stated the annual cost for each pool as reflected in the annual base maintenance and operations charge to the State. IBM defined the cost pools as follows:

- I Project Office
  - A Project office staffing
  - B Project office operating costs
  - C Project office hardware and software
- II CWS/CMS Application Maintenance
  - A Application maintenance staffing
  - B Application test staffing
  - C Application maintenance hardware, software and tools
- III Network Services
  - A Server management staffing
  - B Network services staffing
  - C Network infrastructure
- IV Operations
  - A Central application hosting facility
  - B System security
  - C Database management
- V End User Support
  - A IBM Customer Support Services (help desk)
  - B Hardware, software and maintenance
  - C Technical Services staffing

Each service area has an associated cost provided within the annual baseline payments. The costs for each pool include a contribution to overhead and profit, generally in proportion to the direct labor costs for each. IBM assigns costs internally in accordance with the following general practices:

- Direct labor is assigned to its area on the basis of burdened labor rates for actual hours worked. The labor rates account for all employee salaries and benefits, including paid time off, plus IBM Global Services overhead and profit rates. While the rates are not identical between charges to baseline activities and charges for development effort (for which hourly rates are listed in Rider I to the contract as amended), they are similar in structure and application. IBM did not provide nor did the State request either labor rates by individuals or the roster of IBM staff who provide services within the various cost pools.

- Cost pools that include direct labor also include travel expenses related to the services provided within the cost pool.

- The host data center charges the CWS/CMS contract for their services in a similar manner to the Health and Human Services Data Center in California and other state and local government data centers that receive Federal Financial Participation (FFP). Billings are based on typical data center cost structures and rates, including but not limited to such items as DASD storage, server hosting, mainframe utilization, etc. As is typical with State data center charge back methods negotiated with the USDHHS Division of Cost Allocation, rates cover all the costs related to each billing unit, e.g. mainframe utilization charges include related hardware depreciation and maintenance, software license depreciation and maintenance, management costs, system programmer costs, operator costs, corporate overhead and profit, etc.

- Equipment and software charges to the CWS/CMS contract include amortized acquisition and annualized maintenance costs, plus related corporate overhead and profit.

Following is a table presenting IBM Global Services annual price for the CWS/CMS services decomposed among the service areas listed above:

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Project Management					
Project Office Staffing	$2,816,000	$2,816,000	$2,816,000	$2,921,307	$3,024,968
Project Office Operating Costs	1,878,609	1,878,609	1,878,609	1,885,113	1,900,833
Hardware/Software	1,315,217	1,315,217	1,315,217	1,378,785	1,448,984
Total Project Management	6,009,826	6,009,826	6,009,826	6,185,205	6,374,785
Application Maintenance					
App. Maintenance Labor	8,973,131	8,973,131	8,973,131	9,308,423	9,638,454
Test Labor	2,715,565	2,715,565	2,715,565	2,817,116	2,917,080
App. Maintenance HW/SW/Tools	1,697,826	1,697,826	1,697,826	1,815,162	1,937,031

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Total Application Maintenance	13,386,522	13,386,522	13,386,522	13,940,701	14,492,565
Network Services					
Server Management Labor	3,699,826	3,699,826	3,699,826	3,838,185	3,974,381
Network Services Labor	2,006,783	2,006,783	2,006,783	2,081,828	2,155,701
Infrastructure	1,031,130	1,031,130	1,031,130	1,064,378	1,096,673
Total Network Services	6,737,739	6,737,739	6,737,739	6,984,391	7,226,755
Managed Operations					
Host Services	17,108,613	17,193,609	17,268,609	17,790,514	18,306,203
System Security	569,130	569,130	569,130	602,217	636,197
Database Mgmt.	967,044	967,044	967,044	1,020,900	1,076,031
Total Managed Operations	18,644,787	18,729,783	18,804,783	19,413,631	20,018,431
End User Support					
Customer Service Center Labor/Infrastructure	2,204,782	2,204,782	2,204,782	2,278,263	2,349,732
Hardware and Software Use and Maintenance.	2,518,522	2,518,522	2,518,522	2,650,339	2,784,042
Technical Services	5,657,826	5,657,826	5,657,826	5,867,474	6,073,686
Total End User Support	10,381,130	10,381,130	10,381,130	10,796,076	11,207,460
Total Base Maintenance & Operations Charge	$55,160,004	$55,245,000	$55,320,000	$57,320,004	$59,319,996
System Changes	10,500,000	10,500,000	10,500,000	10,500,000	10,500,000
Dial-up Charges	200,000	220,000	240,000	260,000	280,000
CPU Upgrades (MIPS)					
January 2004 (100)	700,000	1,200,000	1,200,000	1,200,000	1,200,000
September 2004 (184)		2,024,000	2,208,000	2,208,000	2,208,000
October 2005 (184)			1,840,000	2,208,000	2,208,000

October 2006 (173)				1,730,000	2,076,000
August 2007 (173)					2,076,000
May 2008 (161)					483,000
Total CPU Upgrade Cost	700,000	3,224,000	5,248,000	7,346,000	10,251,000
Total Contract Amount	$66,560,004	$69,189,000	$71,308,000	$75,426,004	$80,350,996

Note that the months shown above for upgrades are the months immediately following the upgrade, i.e. the first month of payment for the upgrade.

It is the State's intention to continue to operate under a fixed price model for the proposed contract extension. CPU upgrades will be implemented when mutually agreed by the State and IBM, which will change the base monthly maintenance and operation charge by $1,000 per MIP of the upgrade. There are two costs which will not be included in the fixed monthly base maintenance and operation charges:

- Dial-in charges will be billed as used at predetermined rates, up to a limit of $0.2 million annually; and
- System change tasks will be covered by work authorizations, with prices for each deliverable based on not-to-exceed hours multiplied by hourly rates, up to a limit of $10.5 million annually.

IBM provided the decomposition of cost included herein at the State's request, but it is the State's intention to compensate IBM at a fixed monthly payment amount covering maintenance and operation services. The State negotiated Amendment 20 with IBM to guarantee adequate service levels and performance for a planned and fixed price without the additional expenses that occurred during prior contract periods. IBM in turn priced its services in a manner that is reasonable and generally consistent with industry norms, as discussed below.

Cost Pools Composition

Following is a description of services and service measures for each cost pool.

I Project Office

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Project Management	$6,009,826	$6,009,826	$6,009,826	$6,185,205	$6,374,785

Project office costs are 10.9% of base maintenance and operations charges (BM&O, which does not include CPU upgrades) in the first year, and 8.4% of full amendment costs, which is a reasonable level of administrative costs for a project and contract as complex as CWS/CMS. The standard administrative rate allowed without

documentation as a baseline for state and local government grants from the federal government is 10%. This is universally recognized as a reasonable overhead rate in commercial pricing as well.

We note that the process of allocating project office costs to other direct service cost pools listed in the project cost decomposition is not simply adding 8.4% to 10.9% of the direct costs in a pool. Using Federal Circular OMB A-87 terminology, within the contract we would consider project office costs as indirect and other project costs as direct. Project direct costs for the first year of the extension, excluding project office costs and System Changes, will be between $49 and $50 million, depending on dial-up usage and the need for upgrades. The ratio of project office to project direct costs will thus be between 12.01% and 12.24%. For example, in the analysis of application maintenance costs below, a share of project office costs is added as "overhead" to direct service costs in order to make a consistent comparison with commercial costs. This report uses 12.24% of the direct costs as the overhead factor when appropriate to the analysis. Note that System Change work authorizations receive an additional overhead allocation and thus are excluded from the distribution of project office costs.

A Project office staffing

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Project Office Staff	$2,816,000	$2,816,000	$2,816,000	$2,921,307	$3,024,968

This staff includes IBM's CWS/CMS project management, project administration, project financial, project quality assurance and project team lead staff required to support operations and maintenance efforts. Activities include:

- Contract negotiation and management
- Contractor staff supervision
- Project accounting and billing
- Purchasing and supplier management
- Lease administration
- Preparation and publication of project documentation
- Arrangements and costs for project meetings
- Project presentations
- Configuration management
- Coordination with user groups
- Ongoing quality assurance and CMM Level 3 implementation coordination

The project office staffing is 5.1% of BM&O, which is reasonable.

B Project office operating costs (facilities and supplies)

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Project Office Operating Costs	$1,878,609	$1,878,609	$1,878,609	$1,885,113	$1,900,833

These operating costs support all project staff, including 90 IBM staff and 75 State employees or consultants. Activities include:

- Lease project space for IBM and State staff at 3775 N. Freeway, Sacramento, including common areas used for project meetings
- Provide utilities, insurance, cleaning, maintenance, coffee and water services, and telephone services for occupants of project facility
- Provide normal operating support, including supplies, office equipment rentals, shipping, courier service, etc., for 165 people, 200 PCs, 250 monitors, 36 project printers, 3 copiers, 5 fax machines and 50 project office servers.

The project facilities and supplies cost is 3.4% of BM&O. Note that the costs included in this pool cover non-IBM activities, i.e. the resources needed by the State staff, which typically would not be included in contract project management cost pools. State employees are 45.5% of the population served by this cost pool; if IBM incurred costs only for its staff, the project management percentage would drop to 9.3% of base maintenance and operations costs.

C Project office hardware and software

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Project Office Hardware and Software	$1,315,217	$1,315,217	$1,315,217	$1,378,785	$1,448,984

This cost center includes depreciation, maintenance, upgrades and support for IBM-owned or leased project office equipment, including necessary operating system and desktop software licenses and maintenance:

- 200 PCs (developers and testers generally have multiple PCs)
- 250 monitors
- 36 printers
- 3 copiers
- 5 facsimile machines
- 50 local servers used by the project office and IBM project staff. These include: development servers; technical services software deployment support and test servers; security, internet servers and intranet servers; project documentation and asset management servers; project administration servers; test platform workstation image servers; and CAD development servers.

Note that staff work to support these servers is included in the technical services and network services labor pools.

The project office equipment is 2.4% of BM&O. A more thorough cost allocation model would allocate much of the project office hardware and software costs to other cost pools that benefit from this infrastructure, including application maintenance and technical services staff who use the equipment. The overall project office percentage of 10.9% is somewhat overstated, and the costs of

other service units housed at the Sacramento office (e.g. application test staff, application maintenance staff, technical services staff) somewhat understated.

II Application maintenance

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Application Maintenance	$13,386,522	$13,386,522	$13,386,522	$13,940,701	$14,492,565

In total, application maintenance comprises 24.3% of CWS/CMS baseline maintenance and operations costs before CPU upgrades. This activity is distinguishable from System Change activities provided by IBM outside of BM&O, and includes the following application maintenance activities:

- Level 3 response to problem tickets created by Customer Service Center staff in response to user calls. Activities include researching the problem to see the root cause and initiating a system change request if appropriate, i.e. corrections to the application are necessary.
- In response to system change requests, developing expanded reporting on existing data.
- In response to system change requests, developing corrections and extensions to accommodate existing business rules.
- In response to system change requests, developing corrections to the application for events that occur infrequently and were overlooked during earlier design efforts.
- Packaging groups of corrective maintenance items into interim releases, and supporting the deployment of these releases.
- In response to system change requests and following review and analysis, passing requests for adaptive or perfective development to the appropriate project team.

Activities in BM&O application maintenance do not include developing changes in infrastructure, incorporating statutory or regulatory changes, or adding user-desired or other functionality outside the original system requirements, except in minor cases involving minimal effort to satisfy end user business needs. Adapting the application to new technical environments or business processes, and adding additional functionality, are considered for funding under the System Change portion of the CWS/CMS contract. These activities are conducted through the work authorization process included in the CWS/CMS contract.

Application maintenance contracts are a routine expenditure on commercially available software, and usually are provided by software vendors at annual prices of 17% to 22% of the application license or purchase price. Acquisition of additional functionality and modules increases the underlying price of the software, and vendors typically increase maintenance charges by 17% to 22% of the price of the module when additional modules are implemented. Major version releases of software, e.g. migrating from 5.0 to 6.0, generally include adapting to newer technology as well as increased functionality, and carry their own additional maintenance costs.

Typically, application maintenance contracts include the maintenance activities described in the bullet list above, and also include an application help desk accessible by e-mail and telephone with response time measured in hours. A major component of maintenance contracts is interim releases, and vendors may offer options to customers on whether to take each individual interim release or to wait for larger, combined, less frequent "annual" releases that consolidate several interim releases.

CWS/CMS is a complex application by any criteria. Currently it measures at 54,000 function points, with 4,500 business rules, 500 screens, and a relational database with 250 tables and 3,000 attributes. There are 19,000 or more users generating thoughts about extensions of the application's capabilities in improving child welfare services, including additional reports. There is no apparent basis for assuming maintenance costs would be lower than typical commercial rates.

The application maintenance costs (application maintenance and test staff, and their associated hardware and software costs) included in Amendment 20 BM&O are reasonable, including an appropriate share of project office overhead, as shown below. Since the Customer Service Center activities provided by IBM as part of BM&O include both application help desk – a standard part of application maintenance contracts – and technical help desk covering network, hardware, and non-application software, the analysis includes 74% of the help desk costs to maintain comparison with commercial software maintenance prices. (See Part V A, End User Support, Customer Service Center for further discussion.)

The cost of CWS/CMS in its present state is as follows:

Application Cost, California CWS/CMS

Amendment 2	Rider B-2 design	$ 4,319,936
Amendment 2	Rider B-3	$ 1,203,277
Amendment 2	Rider B-4 Adoptions Requirements	$ 294,118
Amendment 2	Rider B-5	$ 19,820,000
Amendment 2	Rider B-6	$ 57,000,000
Amendment 2	Rider B-5 deployment	$ (14,000,000)
	Original Application Cost	$ 68,637,331
Amendment 8	Rider B-10 Conversion Tool and Testing	$ 1,749,600
Amendment 8	System Changes	$ 8,750,000
Amendment 9b	System Changes – State FY 1998/1999	$ 6,250,000
Amendment 11	System Changes – State FY 1999/2000	$ 6,250,000
Amendment 13	System Changes – State FY 2000/2001	$ 10,000,000
Amendment 13	System Changes – State FY 2001/2002	$ 3,324,820
Amendment 17	System Changes – State FY 2002/2003	$ 10,500,000
	Total Software Cost	$ 115,461,751

Typically application maintenance contracts are priced at 17% or more of the application's cost. If we apply 17% to the CWS/CMS software cost, we would expect the contract costs to be $19.6 million. When we add the costs of the corresponding CWS/CMS services, the BM&O cost for these services is less. The costs noted above for application maintenance are $13.386 million. Costs for the Customer Service Center activities that replicate a commercial vendor's application help desk are 74% of the Customer Service Center costs, $1.633 million. These two items total 13% of the application cost. If we add project overhead, at 12.24% of direct costs, the CWS BM&O cost of services typically included in application maintenance contracts is 15% of the application cost.

Application Maintenance in Relation to CWS Application Cost, $115,461,751

Maintenance Standard	17%	$ 19,628,498
Application Maintenance Actual	12%	$ 13,386,522
Help Desk, 74%	1%	1,633,500
Standard Application Maintenance Services	13%	$ 15,020,022
Standard Application Maintenance, with 12.24% project office overhead added	15%	$ 16,858,473

It is apparent that maintenance on CWS/CMS is reasonable compared to the common commercial standard. The standard is useful for comparison and establishes that the application maintenance cost is reasonable, but it would not be valid for pricing maintenance on this application. Rather, the staffing analysis below more accurately describes the correlation between the CWS/CMS application and the base monthly maintenance and operation component for application maintenance.

A Application maintenance labor

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Application Maintenance Labor	$8,973,131	$8,973,131	$8,973,131	$9,308,423	$9,638,454

This includes designer, developer, and programmer support to the existing application, from staff responsible for responding to user problems and requests. Costs are 16.3% of base maintenance and operations. The demand for application maintenance is driven by the following:

- 6 interim releases issued annually
- 150 system change requests annually
- 1,600 data recovery requests to correct cases that users have updated with erroneous or invalid data

Specific activities include the following:

- Architecture - defining, updating, sizing and matching application support to the existing logical architecture, as well as identifying necessary changes to architecture as CWS/CMS matures and expands
- Design - logically defining how the application will process CWS business events
- Software configuration management - managing the coordination of code releases through development, testing and into production
- Development database administration - maintenance and change to the Relational Data Model that is the underpinning for CWS/CMS processes
- External interface - managing and updating the exchange of data between CWS/CMS and external users, including batch processes that create extracts
- Host interface - managing maintenance and changes to the application at the Host Mainframe level, including coding and testing, resource impact analysis, and host Relational Data Model
- Infrastructure - coordinating the interface between Host and workstations, including generating release code at the workstation level
- Program management reports - developing and verifying project management reports in response to program needs
- Local reports - developing and maintaining reports used at the local level per customer requirements. This includes creation and maintenance of workstation templates.
- Workstation team - code and unit test workstation program changes based on technical specifications from the design team that implement and maintain workstation business rules, navigation tools, and workstation documentation.
- Data recovery - supporting recovery from data errors that arise either from user-created business scenarios or from application flaws. This involves managing a formal Data Deletion process.

Across all of these service areas, application maintenance staff are available and participate in assisting the customer support center with level 3 problem tickets.

Staffing in this area is 34.1 FTEs and includes developers, designers, software quality assurance and programmers. Application maintenance labor is 16.2% of BM&O. These costs are included in the total application maintenance analysis above.

In developing the staffing level for application maintenance, IBM applied metrics based on Caper-Jones (a leading project management consulting firm) standards for application maintenance. This information is included in Appendix A of this document. This analysis suggested an appropriate staffing level of 41 developers and testers for application maintenance, to which IBM has added 4.6 FTEs for the design work on system change requests and 3 FTEs devoted solely to the data recovery activities supporting end users, a total of 48.6. This is higher than actual IBM staffing, 34.1 in application maintenance labor and 12 in test labor.

B Application Maintenance Test Labor

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Application Maintenance Test Labor	$2,715,565	$2,715,565	$2,715,565	$2,817,116	$2,917,080

This team includes quality, test and functional area experts supporting the application maintenance activity with test services. Costs are 4.9% of base maintenance and operations. This staff is separate and distinct from the application maintenance development team. Efforts are coordinated with State test managers and end users. Testing demand is driven by application maintenance activities:

- 6 interim releases issued annually
- 150 system change request annually
- Data recovery requests to correct cases that users have updated with erroneous or invalid data

Specific activities include the following:

- Maintain an overall test strategy
- Establish, implement, and support thorough processes, standards, guidelines, and procedures for testing
- Coordinate testing efforts for maximum efficiency, minimal redundant effort and quality results
- Create, review, and integrate testing plans and identify dependencies
- Perform testing according to the test plans for applications, infrastructure, test environments, external interfaces, database, program management reports, local reports, CAD, data recoveries transactions, and Host
- Establish measurements, processes and tracking for critical success factors that can enhance testing and development organization effectiveness
- Develop and update test cases in accordance with release requirements and the rigorous full lifecycle testing methodology
- Assist in problem determination and resolution
- Identify current decision-making, issue resolution and escalation processes
- Review CWS/CMS architecture and infrastructure to establish testing environments relative to the current dedicated county production state
- Establish, test, manage, and support the test environments required to support application maintenance activities and verify that they are functional and support the needs of the test team, including:
    - Schedule environment time and resources
    - Coordinate, install, and manage code delivery from development into the test environments
    - Act as co-librarian for Workstation Development's source code
    - Set-up the Test Environments for application tests (create User IDs, install additional system software, load application data, assist application with kickoff/setup script modification/creation) and validate that the environments are restored to base configuration after completion of each testing effort

- Verify that Test Environment documentation is complete, correct, and up-to-date (problem log, test setup sheets, other documentation as specified by procedures)
- Provide infrastructure support during testing as required (issue resolution, issue escalation to second level, setup modifications)
- Support all test tools used within the test environments

- Be responsible for automation test tool acquisition, installation, validation, and use as a means of continued test improvement, including:
  - Validate that the tools are installed and functioning in the test environment according to the test schedule and prior to the Test Team needing them
  - Coordinate with test tool vendor to resolve any tool problems incurred
  - Develop and maintain automated test scripts required for maintenance test activities.

Staffing for application maintenance testing is 12 FTEs. These positions are included in the total 46.1 positions for all of application maintenance. Costs are 4.9% of the amendment 20 BM&O. These costs are included in the total application maintenance analysis above.

C Application maintenance hardware, software and tools

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
App. Maintenance Hardware, Software & Tools	$1,697,826	$1,697,826	$1,697,826	$1,815,162	$1,937,031

This includes costs related to providing development and testing regions on the host mainframe in Boulder, plus the costs of development software tools, testing management software, and configuration management tools. The application maintenance pool includes costs for host usage for 71 MIPS on the host mainframes, with the remaining 1119 MIPS billed to the project under Host services as described below. These costs are 3.1% of BM&O, and are included in the total application maintenance analysis above.

III Network services

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Network Services	$6,737,739	$6,737,739	$6,737,739	$6,984,391	$7,226,755

Network Services comprises 12.2 % of Amendment 20 BM&O costs, before CPU upgrades.

Per unit standard costs for networks are not readily available, especially at an application level as opposed to an organization level. A large set of variables significantly affect costs including: application architecture (dumb terminal vs. client server vs. browser); geographic coverage; availability of trunk carriers; pricing of "last mile" telephone companies; remoteness of end user sites; etc. A suitable per-user network price inside the State of Massachusetts, with a high density of infrastructure

providers and competition, will be significantly different from an application in Wyoming, based on less available infrastructure in some areas of that state.

Additionally, services that support network activities are not restricted to the IBM contract. HHSDC provides State-wide WAN support, and coexistent counties may provide internal network maintenance support. However, per-unit costs that can be calculated appear reasonable.

Connectivity between the county and project central sites is provided by HHSDC Wide Area Network (WAN), which includes HHSDC support of county- and state-housed routers. IBM Network Services staff is responsible for ensuring that the suite of servers at the counties and the communications infrastructure at IBM's Boulder data center meet the performance level guarantees within the contract.

Responsibility for the CWS/CMS network thus is shared between HHSDC and IBM, with HHSDC wide area network costs currently at $4.2 million annually. This results in total network costs of $10.937 million annually. If the number of authorized users increases at 0.25% each month from January 2003, then the average number of users in the first year of the contract will be 19,830, and network cost per user per month will average $46. At the current number of sites, 390, the cost per site per month will be $2,337. Given the geographic coverage of the network and the need for continuous, uninterrupted and secure availability, this cost is reasonable. For example, typical T-1 line costs in California exceed $1,000 per month for the telephone company costs only, to which must be added all support labor, router, switch and hub costs, software costs, etc. Within the context of the size of the application, IBM's share of network costs is reasonable, in that they bear responsibility for supporting most of the network related equipment.

The State is considering modifying the CWS/CMS application to a browser-based architecture, which would significantly reduce the cost of maintaining individual workstations and avoid the need for mass deployment of application updates. However, this architecture would very likely cause a significant increase in network traffic and bandwidth usage, and probably result in increased network costs. The analysis herein does not consider this system modification.

A Server management labor

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Server Management Labor	$3,699,826	$3,699,826	$3,699,826	$3,838,185	$3,974,381

In this cost pool, IBM provides staff to support the suite of servers and related software products, including implementation of the 6 annual CWS/CMS interim releases. Costs are 6.7% of amendment 20 BM&O. These costs were included in the per-unit network analysis above. Supported platforms include:

- 388 Intel application servers, including 26 of the IBM-owned servers included within the project office hardware and software pool, 295 county-based and State owned application servers, 15 State owned training servers, 5

Customer Support Service (help desk) servers at IBM's Boulder facility, and 47 network services servers at Boulder.
- 79 domains across these servers
- 20 AIX RISC servers, including: 3 CAD and a related Web server in Sacramento; and 2 Web servers for the RTS problem and change request tracking system in Boulder; 6 network management servers in Boulder, 6 server management servers in Boulder, and 2 Customer Support Services servers in Boulder
- Outlook users

Responsibilities of the staff include maintenance and support for the project office servers. They are responsible for service and maintenance for the county application and network support servers that are key to meeting the contract's service level guarantee. They operate and maintain a set of 47 network servers in Boulder that perform critical functions, including configuration management, software distribution, application version control, server image, remote server management, internet naming resolution, capacity monitoring and performance monitoring.

Server Management develops and maintains the scripts that install, configure and maintain the Outlook client on the workstations that subscribe to the project email offering. Installation consists of installing the Outlook software from the county CWS/CMS software distribution server onto the workstation. Configuration consists of modifying the Outlook client with the appropriate properties such as which Exchange server to use; maintaining consists of applying any software maintenance to the Outlook client. For interim releases, server management handles application code distribution to the servers for installation on all county workstations.

Server management staff applies the CWS/CMS application code changes to the software distribution servers. For most of the counties, IBM also distributes the code to the county desktops through IBM supported network "log-on" procedures. While some counties perform their own client installation, IBM provides full support to all the counties to make sure that all of the clients, servers and the mainframe are synchronized when there is a new release. This requires coordinating with all the various coexistent county standards.

This team also provides full Antivirus support (engine upgrades, signature file upgrades and problem identification and resolution) for all of the CWS/CMS servers and over county 14,000 desktops. Six co-existent counties do their own Antivirus support at the desktop level, while IBM supports all other users including the Outlook and Exchange services. Expected growth in workload arising from the server migration (OS/2 to Windows) and from the proposed migration of the desktops from Windows 95 to Windows 2000 is covered within the base maintenance and operations charge.

The average cost of server support per year is $9,100, which is equivalent to 16-18 servers per FTE. This is reasonable in light of the mission critical nature of these servers.

B Network services labor

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Network Services Labor	$2,006,783	$2,006,783	$2,006,783	$2,081,828	$2,155,701

Staff to support the connectivity necessary for CWS/CMS online operations, data retrieval service (CAD) and project Outlook Exchange e-mail services available to users for CWS/CMS e-mail support. Costs are 3.6% of BM&O. These costs were included in the per-unit network analysis above.

The network infrastructure components managed and supported by network services labor include:

- 19 Outlook Exchange servers, 7 in Sacramento, 11 at county locations, and 1 in Boulder
- 397 project sites
- 5 Host routers in Boulder and Sacramento
- 48 County & DSS Remote Monitoring (RMON) units
- 402 County Hubs and Switches
- 261 County uninterruptible power supplies
- 10 Boulder switches and hubs

In addition, Network Services monitors the following units:

- 295 County application servers
- 37 Boulder infrastructure servers
- 262 County and HHSDC routers

The Network Services team prepares quarterly network capacity planning documents for CWS/CMS, providing planning information to HHSDC and the coexistent counties for all of the circuits used by CWS/CMS. This information is used by HHSDC and the coexistent counties to prepare their budgets and to schedule appropriate hardware and software upgrades. The team is responsible for level 3 response on problem calls, identifying whether problems are WAN or local network related, with WAN problems referred to HHSDC. In total, Network Services manages and/or monitors 1,339 system hardware components, at an average cost of $1,500 per unit. This is roughly equivalent to an average 12 hours annually for each unit, which is reasonable.

C Infrastructure

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Network Infrastructure	$1,031,130	$1,031,130	$1,031,130	$1,064,378	$1,096,673

This cost pool includes hardware depreciation/use charges and maintenance costs, as well as data communication circuit charges, for network operation. Costs are 1.9% of BM&O. These costs were included in the per-unit network analysis above. Specific items include:

- Monthly line lease charges for 6 T1 circuits plus 1 backup circuit
- 52 Network Services servers housed at the Boulder Center and owned by IBM
- 4 AIX CAD servers housed in the Sacramento project office
- 16 AIX web servers housed at the Boulder center.

Typically a midrange Windows server will cost $22,000, and a low range AIX server $85,000. Assuming a 3 year life and 12% of acquisition for annual maintenance, the resulting annual cost for the Network Infrastructure servers depreciation would be $948,000 annually, and for maintenance $341,000. To this would be added the T1 line cost, which typically would be $1,200 per month per line, or about $0.1 million annually. The network infrastructure cost of $1.031 million annually is reasonable.

IV Managed operations

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Managed Operations	$18,644,787	$18,729,783	$18,804,783	$19,413,631	$20,018,431

These services consume 33.9% of the contract resources, and include the centralized mainframe servers that host the applications primary databases. Also included are the costs for hosted web-based services.

The common measure for host services is MIPS capacity, with cost efficiency expressed as cost per MIP per year. Although cost are not always comparable among organizations – there is not a universal definition of "cost" – industry standards are $15,000 - $20,000 per MIP per year in direct costs, which does not always include depreciation on equipment. The full first year cost per MIP in Amendment 20 is $16,622, at $18,644,787 (all of managed operations) for 1119 MIPS. (Note that costs related to 71 MIPS additional are included with application maintenance costs.) If the planned December 2004 upgrade is implemented, the average MIPS for the year will be 1177.3, costs will be $19,344,787, and cost per MIP will drop to $16,431.

In both public and private industry, data centers most typically are a support service to line operations. Their costs are overhead allocated or billed to users within the organization, rather than a separate profit or operating pool. As such, external overhead costs typically are not included in cost per MIP calculations. However, if IBM's project management costs are included, the cost per MIP for the first year is $18,729, which is still within the range of reasonable costs.

As each upgrade is added, cost per MIP declines. In year 5 of the contract, assuming that all projected upgrades prove to be needed and are implemented, the

cost per MIP will be $15,459 for an average 1,958 MIPS, a 7.2% drop despite 4 years of inflation. The July 2008 payment will include managed operations costs at $15,147 per MIP per year.

Scaling on the mainframe appears appropriately managed. Client server applications typically require 10 to 20 megabytes of memory for each online user. Active users average just over 15,000. Typically one-third of active users are concurrently using the system, and 4,500 concurrent users share 46 gigabytes, or 10.4 megabytes per user. Similarly, the system generally is scaled to run on average at 60-70% capacity, with upgrades occurring before capacity reaches a monthly average of 70% utilization. At 70% average, short-term peaks in usage exceed 85%, which anecdotally causes a noticeable slowing in response.

A Host services

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Host Services	$17,108,613	$17,193,609	$17,268,609	$17,790,514	$18,306,203

This is the single largest cost pool within the contract, at 30.8% of BM&O. The host is configured of 2 S/390 servers (9672-R56 and Z-series 2064-103) in a parallel sysplex running OS/390 version 2.10, with 1190 MIPS of capacity, 42 gigabytes of internal memory and 1.6 terabytes of direct access storage available. Operating costs from the Boulder data center are billed back to the CWS/CMS project, and include all costs related to mainframe operations, including:

- Mainframe depreciation and maintenance
- Mainframe operating system and utilities license and maintenance costs
- Mainframe operations staff, who perform 3300 tape mounts a month, and schedule 10,500 batch jobs each month
- Mainframe system programming staff
- SNA network connectivity between the host and application servers in the counties

The increase in BM&O occurring in year 2 and year 3 of the contract are intended to cover costs related to increased disk Direct Access Storage Device (DASD) usage. Typically a maturing system will see continued growth in the size of its databases, and CWS/CMS shares this pattern, as follows:

- As users understand the full capabilities of the system, they add more data to cases.
- CWS/CMS does not have an archive policy, and all cases are still on line.
- Even as children reach age 18, it may not be desirable to archive their cases when younger siblings have active cases and family history may be important information.

In 2002, IBM and the State project team undertook to remove unused data from the system. This was intended to forestall DASD ARCs that are included in Amendment 13, billable at $110 per gigabyte per month for usage above 1,214 gigabytes. In October and November 2002, DASD storage dropped 10% over

the September level, but current projections are for ARC DASD charges to begin in May 2003.

A main data storage unit for CWS/CMS is an IBM 2105-F20 Shark Enterprise Storage Server. It includes 16 gigabytes of resident cache memory, which reduces data storage access times, improves response times, and improves CPU efficiency. It includes full RAID 5 redundancy to ensure data availability even if a disk drive fails.

IBM continued their projection model and determined estimated storage volumes through the period proposed for amendment 20. They assumed that usage would increase each month by 1.24%, which is the average rate of growth from October 2001 through September 2002. Data was not retained prior to October 2001. Following is a summary of their projections, together with each year's gigabyte – months that would have been billed under the terms in amendment 13:

Date	Projected DASD Storage, Gigabytes	Gigabyte-Months, for Prior Year	Cost per Gigabyte per Month for DASD Upgrade
July 31 2003	1,256		
July 31 2004	1,456	1,268.0	N/A
July 31 2005	1,688	1,475.7	$ 54.21
July 31 2006	1,959	1718.3	$ 43.65

The cost per gigabyte per month is based on DASD upgrades included in BM&O for amendment 20 years 2 and 3. IBM proposed and the State accepted an increase in BM&O of $85,000 in year 2 and an additional $75,000 in year 3 to cover increased data storage. The cost to the State for increased storage with the capabilities provided is reasonable, and a significant reduction from amendment 13 pricing.

B System security

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
System Security	$569,130	$569,130	$569,130	$602,217	$636,197

This includes labor and software monitoring tools to maintain 19,000 user identification numbers, growing historically at a rate of 4% annually. Costs are 1.0% of BM&O. The system security staff provides continuous security monitoring with planned monthly testing and reporting, plus the use of "sniffers" to perform random testing or in response to specific concerns. The cost per user ID is $31 per year. However, these costs typically are included in the hardware usage charges, and are included in the cost per MIPS analysis above.

C Database management

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Host Mainframe Database Management	$967,044	$967,044	$967,044	$1,020,900	$1,076,031

This pool includes expenditures for labor and software tools to maintain the relational databases that underlie CWS/CMS, including a relational database with 250 tables and 3000 attributes (corresponding to data fields). Costs are 1.8% of BM&O. Activities include analyzing performance, managing indexes, and tuning as needed. Staffing varies based on need between 2 and 5 positions. Typically these costs are included in data center chargeback mechanisms within hardware usage rates, and in this analysis they are included in the cost per MIP analysis above.

V End user support

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
End User Support	$10,381,130	$10,381,130	$10,381,130	$10,796,076	$11,207,460

These services include what is sometimes referred to as a "help desk" activities, as well as direct support for dedicated county workstations, and State-authorized support for selected desktop and software issues for dedicated counties. This activity utilizes 18.9% of BM&O.

Each component of end user support is analyzed separately.

A IBM Customer Support Services

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Customer Service Center Labor & Infrastructure	$2,204,782	$2,204,782	$2,204,782	$2,278,263	$2,349,732

IBM Customer Support Services (Helpdesk) provides a single point of contact for assisting the CWS/CMS application user in both dedicated and co-existent counties. The CWS/CMS application is a client-server application that is tightly integrated with Microsoft Windows 95/2000, Microsoft Office 97 and the associated infrastructure. The associated infrastructure consists of the network hardware, servers and the hosts that support the CWS/CMS application and external interfaces. Customer Support Services comprise 4.0% of BM&O.

In 2002, the help desk opened 11,587 problem tickets, and 11,744 were closed. Tickets when opened are assigned a severity level, which ranges from high (repair necessary with 24 hours) to low (assignment as an item to be considered for a System Change rather than maintenance). Problem tickets are also assigned to various disposition cues, depending on the repair referral.

To assist the CWS/CMS application user (customer) the Helpdesk is logically organized into three levels of support. Level 1 and Level 2 support all products associated with the CWS/CMS Project for dedicated counties. Level 1 and Level 2 support the CWS/CMS application for coexistent counties. Products associated with the CWS/CMS project include but are not limited to: Microsoft Windows 95/2000, Microsoft Internet Explorer, Microsoft Office 97, Microsoft Outlook 98, CWS/CMS Application and Adobe Acrobat Reader. Level 3 provides application maintenance support of the CWS/CMS application.

The following describes the three levels of support and their scope of responsibilities.

- Level 1 - Level 1 support answers the initial call and assists the customer in assigning a priority and severity to their issue. Level 1 documents the issue in a problem ticket. If possible, Level 1 will resolve the issue during the customer's initial call. Level 1 support is responsible for ensuring that all problem tickets are appropriately resolved and closing the associated ticket. If Level 1 cannot resolve the issue, then Level 1 will refer the ticket to Level 2 support for more in-depth analysis. Level 1Customer Service Representatives (CSR) are trained in detail on the CWS/CMS application prior to supporting the customer. This training process takes 6 weeks. The CSR must learn how to use/utilize the following tools during their training: RTS/PTS, Cache Editor, Doctool, Trace, On-Line Help, TSO/Princeton Softech, CWS App Execs, Visual Basic, XTOOLS, and Shadow. They must also be familiar with the support structure in order to determine how to correctly refer unresolved tickets. When the training is complete, each CSR works with a peer mentor to assist with customer issues. After 6 months a CSR is considered an experienced agent and can handle the majority of application issues independently.

- Level 2 - Level 2 support consists of subject matter experts that perform in-depth problem analysis. They assess the issue by recreating the problem to identify the customer's specific issue. During the course of troubleshooting, Level 2 CSRs can access dedicated county client's workstations remotely and control their desktop. Remote takeover enables the CSR to see the issue being reported on the actual machine on which it is occurring. Level 2 CSRs also use remote takeover capabilities to rebuild the workstation. The process of rebuilding (re-imaging) a workstation is tedious and lengthy. Workstation rebuilds take, on average, 90 minutes to complete. The CSR then reconciles the workstation software inventory and configuration to ensure the workstation re-imaged correctly. If this resolves the issue the CSR will queue the issue ticket back to Level 1 for follow-up and closure. If the error suggests a bug, or problem, in the CWS/CMS application they will refer the issue ticket to the appropriate support team. Level 2 agents must be familiar with the Level 1 toolset and be able to provide in depth documentation and instruction for the next level of support.

- Level 3 - Level 3 support consists of CWS/CMS application developers that ensure the CWS/CMS application is performing to the specifications outlined for that release. Developers will validate the problem and schedule a fix if

appropriate. If resolved without development effort they will refer the ticket to Level 1 support for closure. If development support is required it will be referred to a development queue for the next maintenance or full release. Costs for these developers are included as part of application maintenance staff discussed above.

Customer Support Services Hours of support operations:

CWS/CMS Application Support:

- Monday through Friday - 6:00AM PST to 7:00PM PST
- Saturday and Sunday - 12:00PM PST to 12:00AM PST

Infrastructure Support

- 24 hours a day, 7 days a week, 365 days a year

The Customer Service Center offers both application support and desktop/network support. The Level 1 staff receive extensive training in the application and its support software, in order to assist users with application utilization questions. Over 70% of calls are dealt with at Level 1 and do not generate a problem ticket, since most application-focused user problems can be resolved by the initial responder. For a dedicated application help desk, the staff become an extension of the training process, assisting users put into practice what they learned in the class. This differs from a conventional data center help desk, where the Level 1 staff do not participate in specific application questions, but rather deal with network, data communication, desktop and other technical problems.

For an application help desk, there are definite economies of scale in staffing; an application with a large user population (20,000) will have fewer help desk positions per user than a similar application with a small (less than 1000) user population. The low end would be 200 users per application help desk position, where the need to have 9 hours by 250 work days covered sets a minimum of two positions. At the high end, there appears to be a practical limit of 800 to 1000 users per application help desk position. At these ratios, 7% annual turnover in users requires each help desk position to support 28 to 35 users with less than 6 months experience with the application, and these users with their more frequent problems are the key workload drivers that seem to limit the number of users per help desk position.

This analysis concluded that a significant portion of CWS/CMS customer service center activities are related directly to the application, and hence should be included in our comparison of commercial software maintenance contracts to similar BM&O costs in the proposed contract extension. Failure to include comparable services would invalidate our application maintenance comparison. At 1000 users per application support FTE, an average hourly rate of $55 billable for 1800 hours per year, and 16,500 active users, application help desk costs are approximately $1,633 million, or 74% of the total Customer Service Center costs within the CWS/CMS contract extension BM&O. The balance of the help desk costs support other user needs such as passwords, connectivity problems, server problems, and dedicated desktop problems.

The Customer Service Center costs are approximately $9.50 per user per month, split between application support, connectivity support, and desktop support. However, the costs that relate to technical issues rather than application support, more typical of a data center help desk, are approximately $2.90 per month, which is reasonable.

B Hardware/software/maintenance

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
End User Hardware and Software Maint.	$2,518,522	$2,518,522	$2,518,522	$2,650,339	$2,784,042

Costs included in this pool are hardware and software maintenance for the following:

- 19 Exchange E-mail servers
- 14 State-owned servers, including the State's LAN server, 4 State test servers, and 9 Model Office servers
- 295 county- and DSS-based application servers, owned by the State
- 15 training servers.

These costs are 4.6% of base maintenance and operations. The average cost of hardware and software maintenance is $7,342 per unit, and primarily consists of out-of-pocket costs paid by the contractor. Following are the products included:

- CAD Hardware
- CAD Software
    - Business Objects
    - AIX
    - DB2 UDB
    - Tivoli Software
    - Quest Central for DB2
    - BMC Change Manager for AIX
    - Candleworks Performance
- Server Hardware Maintenance
- Server Software Maintenance/License
    - Tivoli Service Desk
    - Host Integration Solution Internet Concur (PCOM 3270 Replacement)
    - Antivirus
    - Netfinity

Given the suite of products utilized by CWS/CMS and supported by maintenance, the costs are reasonable.

C Technical services

	8/1/03 – 7/31/04	8/1/04 – 7/31/05	8/1/05 – 7/31/06	8/1/06 – 7/31/07	8/1/07 – 7/31/08
Technical Services Staff	$5,657,826	$5,657,826	$5,657,826	$5,867,474	$6,073,686

Activities of the technical services staff include the following:

- Provide 8400 hours technical support to counties operating under the coexistent model, where county staff support user desktops. Use of these hours requires prior State approval. This is approximately 20% of the technical services total cost.
- Provide Level 2 help desk response to dedicated county workstations.
- Certify State- or county-procured workstations for support in the CWS/CMS environment.
- Provide image development and post-installation image recovery services for new PCs installed in dedicated counties.
- Test workstation hardware and software configurations as these units are acquired by the counties or State and certify for support.
- Create and maintain software image for installation on workstations acquired by counties or the State.
- Support CAD users. This support is approximately 15% of technical services costs.

Technical services staff costs are 10.3% of BM&O. Workload consists of supporting the following:

- 218 CAD users
- 3200 dedicated county users at 37 counties, many in remote locations
- Technical support of project office site with 200 PCs
- Technical support for project office LAN supporting 90 IBM project staff

Technical Services assists the Server Management group with deploying application updates to end user desktops. Although the process is automated, desktop problems occur, and are resolved by this team.

The physical distribution of workstations for dedicated counties across the large geographical area and sometimes remote locations within California places considerable demands on technical services staff. This produces upward pressure on service costs by reducing direct service hours and increasing travel time. However, IBM effectively offsets this problem using technology.

The workload standard for personal computer support in a client server environment such as CWS/CMS is 50 to 100 PCs per FTE, which is approximately 16 to 33 hours per workstation per year. Under this model, with staff rates of $121 per hour on average, the cost of maintaining 3200 dedicated workstations and 200 office PCs would be unaffordable. IBM utilizes technologies such as desktop imaging, image recovery, and remote desktop control for CWS/CMS. Assuming that 65% of the cost of technical services is

desktop support, at IBM's quoted rate of $121 for technical services staff, each FTE is supporting 185 user PCs, considerably above the standard. Increasing the number of PCs supported per FTE results in fewer FTEs and lower costs.

The County Access to Data (CAD) data warehousing team provides downloaded data bases running in the AIX environment and Business Objects as a query tool for responding to end user information needs. Their work includes ongoing development of the CAD database and operating procedures, as well as database management, coordination of CAD databases to the host database structures, and administration of the Business Objects query tool. They are supported by technical services staff, which performs host database downloads, and uploads of data to counties.

Additional Contract Services

In addition to the BM&O costs, Amendment 20 provides for three additional service payments:

System Changes are modifications to meet remaining unmet system requirements or user-driven major change requests. The contract continues the practice from Amendment 19 of including $10.5 million to fund these activities. The funds will be managed by the work authorization process, where the contractor is authorized to expend an agreed number of hours of work for a specified deliverable at a specified price.

A significant improvement in Amendment 20 is the cost of labor hours billed to work authorizations by IBM. Rider I of the contract was amended to both reduce and freeze for two years all labor rates. The following table compares the rates on July 31, 2003, and August 1, 2003:

Staff Position	Rate July 31, 2003	Rate August 1, 2003
Consultant	$201	$193
Application Developer	$170	$161
Staff	$126	$121
Data Entry/Clerical	$56	$54
Trainer	$140	$134

These rates for the new contract were based on increasing the rates in effect on August 1, 2000 by the Bureau of Labor Statistics index for professional, specialty and technical occupations through September, 2002. For the first two years of the contract, these rates will not change. In subsequent years, beginning August 1, 2005, labor rates will be raised in accordance with increases in this index. The lower rates will result in approximately 3,000 more hours of system change activity within the $10.5 million contract limit.

Dial-In Charges are costs to use a telephone dial-in to the Host facility in Boulder and connect to the CWS/CMS application. This is useful for caseworkers who operate outside connected office sites in remote locations. Costs are unchanged from Amendment 13, at $3.50 per hour and $6.00 per hour for the toll free number. These rates are typical of data center connection charges.

The contract stipulates that IBM will bill the State based on actual usage, as in past practice. In 2001, total dial-in charges were $151,000, and in 2002 total dial-in charges were $142,000. Additional funding to $200,000 in the first contract year was included ostensibly to cover increased usage, with an additional $20,000 added in each subsequent year of amendment 20 to provide for increased usage. No specific information supports this projected increase, but the cost is nominal in relation to the overall contract. There is a belief among CWS/CMS staff that users will increase their utilization as the utility of the dial-in service is better understood and appreciated.

CPU Upgrades will be provided by IBM at the cost of $1,000 per MIP per month for each upgrade, from the first month after the upgrade is installed through the duration of the contract. Based on an assumed increase in CPU utilization of 11%, IBM projected a schedule of upgrades that reflect their current preference for upgrade size. The

scheduled date for the upgrades is based on the points in time where utilization will become close enough to capacity that further increases in utilization will degrade response time. IBM's proposed schedule is as follows:

Upgrade Date	Upgrade Size
December 2003	100 MIPS
August 2004	184 MIPS
September 2005	184 MIPS
September 2006	173 MIPS
July 2007	173 MIPS
April 2008	161 MIPS

A factor that influences the size of the upgrade is the desire to avoid frequent upgrades with their resulting disruption and impact on Host staff workloads. The schedule IBM proposed results in upgrades roughly one year apart, which is reasonable in managing a data center's costs and allowing the lower unit price of $1,000 per MIP per month.

Analysis of recent utilization data suggests that the rate of increase in utilization is slowing. In fact, in January 2003, CPU hours per day and average MIPS utilization declined from January 2002, the first time this event has occurred. Most systems that have minimal additions to functionality will continue to experience growth in CPU utilization as data bases grow and data base retrieval and update processes take longer to search through the expanded data base. However, this growth is typically in the low single digits, 2% to 5%. If in fact CWS/CMS has reached stability and saturation in users, then the 11% growth rate may not be realized, and upgrades will occur later than scheduled and perhaps smaller in size.

Counter to this trend is the remaining unfinished SACWIS functionality. Much of the functionality addition will of necessity involve interfaces, which tend to be less CPU intensive than user-based activities. However, adoptions functionality will have a significant and as of now undeterminable impact, and could increase CPU usage dramatically. Thus, while the 11% increase in CPU utilization offered by IBM may seem high, the third year of amendment 20 could potentially see implementation of additional functionality that will increase CPU utilization above recent levels.

In summary, it is not possible to predict with certainty what upgrades will become necessary. It is clear that the schedule included in the contract allows for "growth room" above the system's current level of operations. It is likely that actual upgrades will occur later than provided by the contract. Fortunately, amendment 20 includes provisions that limit payments for upgrades until they occur, and require State approval for upgrades before they are implemented. And, with a marginal rate that is below the average cost per MIP for the existing CPU capacity, amendment 20 provides an economical, practical and fully funded vehicle for managing growth.

APPENDIX A
CWS/CMS CONTRACT
SUPPORT FOR APPLICATION MAINTENANCE STAFFING
PER CAPER-JONES STANDARDS

Activities involved in maintenance	Details	Counts	Staff
Application Maintenance, Design and Development of Corrective Actions			
	Total # of DPUs (problem reports that indicates need for an application change) in a year for maintenance	1,727	
	DPUs by system component/user need		
	Total # of DPUs for Workstations in a Year (60%)	1,036.2	
	Total # of DPUs for Infrastructure in a Year (15%)	259.05	
	Total # of DPUs for Local Reports in a Year (15%)	259.05	
	Total # of DPUs for Host in a Year (10%)	172.7	
	Total	1,727	
	Lines of code per DPU by system component/user need		
	Total # of lines of Visual Basic code (workstation) impacted per DPU	240	
	Total # of lines of C++ code impacted per Infrastructure DPU	400	
	Total # of lines of C++ code impacted per Local Report DPU	240	
	Total # of lines of COBOL code on Host impacted per DPU	700	
	Total annual lines of code by system component/user need		
	Total # of lines of Visual Basic code impacted for all workstation DPU	248,688	
	Total # of lines of C++ code impacted for all Infrastructure DPU	103,620	
	Total # of lines of C++ code impacted for all Local Report DPU	62,172	
	Total # of lines of COBOL code impacted for all DPU	120,890	
	Capers Jones' Standard for lines of code per Function Point		
	Visual Basic	37	
	C ++	95	
	COBOL	91	
	Capers Jones' Standard for Function Points per person year	240	
	Function Point Summary		
	Total Function Points for Workstation Maintenance Efforts	6721	28
	Total Function Points for Infrastructure Maintenance Efforts	1091	4.6

Activities involved in maintenance	Details	Counts	Staff
	Total Function Points for Local Report Efforts	654	2.8
	Total Function Points for Host Maintenance Efforts	1329	5.6
	Total Function Points, CWS/CMS Annual Maintenance	9795	
Total Staff for Developing Changes	Total Function Points divided" by Capers Jones' Standard for Function Points per person year		41
Total Staff for Design Support on Changes	Staffing For System Change Request Analysis		4.6
Data Recovery			3
Total Resources Required			**48.6**